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UNITED STATES DISTRICT COURT

DISTRICT OF OREGON

NATIONAL WILDLIFE FEDERATION, *et al.*

Plaintiffs,

v.

NATIONAL MARINE FISHERIES, U.S. ARMY CORPS OF ENGINEERS, and U.S. BUREAU OF RECLAMATION,

Defendants.

COLUMBIA SNAKE RIVER IRRIGATORS ASSOCIATION, *et al.*,

Plaintiffs,

v.

CARLOS M. GUTIERREZ, *et al.*,

Defendants.

Civ. No. 01-00640-RE (Lead Case)
Civ. No. 05-0023-RE
(Consolidated Cases)

DECLARATION OF BRUCE K. SUZUMOTO NOAA FISHERIES SERVICE
(Injunctive Relief)

I, Bruce K. Suzumoto, declare and state as follows:

1. I am the Assistant Regional Administrator for the Hydropower Division of the National Marine Fisheries Service (NMFS) in the Northwest Region, which includes the states of Oregon, Washington, Idaho and Montana. I have been in this position since October 17, 2005. My current responsibilities include supervision of 26 biologists, engineers, hydrologists, and administrative staff located in Portland, Oregon, and Lacey, Washington. In this capacity I supervise the Federal Columbia River Power System (FCRPS) Branch of the Hydropower Division, which evaluates biological impacts of Columbia Basin mainstem hydropower projects and storage projects operated by the U.S. Army Corps of Engineers (Corps) and U.S. Bureau of Reclamation (Reclamation). The FCRPS Branch primarily implements NMFS' regulatory responsibilities under the Endangered Species Act (ESA), including preparation of biological opinions on FCRPS operations.

2. I am a fisheries biologist with 28 years of professional and management experience in the field of Pacific Northwest fisheries management. A copy of my resumé is attached as Exhibit A. Prior to taking my current position with NOAA Fisheries I provided technical analysis and policy development in the areas of hydropower, artificial production and harvest for the Northwest Power and Conservation Council. In that position, I gained a working knowledge of NOAA Fisheries' Simulated Passage model known as SIMPAS and the FCRPS 2004 Updated Proposed Action.

3. In preparation of this declaration, I have reviewed the Plaintiffs' Motion for Further Injunctive Relief as well as the declarations submitted in support of that motion by Robert Heinith and Thomas Lorz and those incorporated by reference from Frederick Olney and Stephen Pettit. I have also reviewed the Declaration of Colonel Martin on the Corps of Engineers' planned FCRPS river operations for the 2006 spring and summer migratory seasons. Finally, I have also reviewed the First and Second Declarations of John G. Williams upon which the data and analysis contained in my

declaration is based.

4. The purpose of my declaration is twofold. First, to present estimates of the relative percentages of salmon and steelhead that are either transported or migrate in-river under three different scenarios of river operation: 1) the 2004 FCRPS Updated Proposed Action operation; 2) the Plaintiffs' proposal for injunctive relief; and, 3) the Corps adaptive management plan for operations in 2006. Based on these estimates, and relying on studies presented in the Second Declaration of John G. Williams, my staff was also able to calculate the percentage of smolt-to-adult returns (SARs) for each of the three proposed spring operations. Second, I also discuss the opinion of Mr. Thomas Lorz regarding the preliminary report prepared by the Fish Passage Center ("FPC") referenced in his declaration at paragraph 28.

5. As discussed in greater detail below, our modeling indicates that: (1) the Corps of Engineers' (COE's) planned 2006 spring operation will significantly increase adult returns as compared to the plaintiffs' proposed operation; and (2) the COE's planned 2006 summer operation more closely adhere's to a 50% "spread the risk." I further conclude that the COE's planned operation for 2006 is a proper application of adaptive management within the expectations of NOAA Fisheries Service's 2004 Biological Opinion for the FCRPS. It is also my professional opinion that Mr. Lorz' broad conclusions based on the FPC report do not accurately reflect the FPC's preliminary analysis, nor is his reliance on the report scientifically sound.

SIMPAS MODELING

I. TRANSPORTATION AND IN-RIVER MIGRATION PERCENTAGES

6. My staff conducted various analyses using the NMFS SIMPAS model[1] to determine the

[1] The version 9 (2004 remand) version of the SIMPAS passage model (dated March 2004) was used for this analysis. The March 2004 version of the SIMPAS model was not updated with more recent 2004 or 2005 fish passage data due to time constraints and the fact that such updates are the subject of NMFS' collaboration with regional parties in development of a new, updated juvenile fish passage model. Although

percentage of juvenile fish that were collected and transported under three operational scenarios. All SIMPAS model studies conducted to support these analyses are based on Snake and Columbia River flows observed during 1995. Water year 1995 was close to an average water year, with 97% of normal runoff in both the Snake and Columbia rivers. Since an official runoff forecast for 2006 has not been produced yet by the NOAA-National Weather Service Northwest River Forecast Center, the 1995 water year was selected because it represents an average flow condition that could be observed in the Columbia and Snake rivers next year.

A. Spring Operations

7. For spring migrants, three operational scenarios were evaluated. The first was the 2004 FCRPS Biological Opinion operation (2004 BiOp), which is used as the baseline to compare the other operations against. The second operation is the Plaintiff's proposal for injunctive relief (P.I.). The third operation is the federal agencies' adaptative management plan for 2006 operations (adaptive management or 2006 operation). The three different spill operations were then evaluated using the SIMPAS model to determine the percentage of fish transported and the percentage of fish migrating in-river under each operation.

8. For both the 2004 BiOp and Plaintiff's proposed operation, a single model study was conducted to evaluate the average percentage of fish transported and the percentage of fish migrating in-river over the entire spring season. In the case of the federal agencies' 2006 operations, two model studies were conducted to account for the temporal and changing nature of adult return rates of both transported and in-river fish in weekly time increments for both Snake River spring/summer Chinook

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updating the model with recent fish passage data could lead to slightly different estimates of the percentage of fish transported vs. fish migrating in-river, it is the *relative* differences in the percent of fish transported between the different operating scenarios this is most useful and important in this analysis, assuming the passage parameters are all held constant.

salmon and Snake River steelhead (see Williams Second Declaration at paragraph 28). The first temporal period encompassed the April 3-19 period, which included spill for fish passage at the three Snake River collection and transport projects to maximize in-river passage and survival for early spring migrants that experience higher SAR rates from in-river migration (ref. Williams Second Declaration at paragraph 29). The second period covered the April 20 through May 31 period, which turned spill off at the three Snake River transport projects to maximize collection and transportation of later spring migrants that experience higher smolt-to-adult return rates from transportation (ref. Williams Second Declaration at paragraph 29). From these modeling studies, the percentage of fish transported[2] and the percentage of fish that remained in-river[3] were then entered into a separate spreadsheet analysis that estimated adult returns based on weekly SAR rates of both transported and non-transported (in-river) for both listed species to optimize adult return rates over the spring season.

9. The results of these SIMPAS modeling studies are shown in Table 1 below.

	SR sp/su Chinook	SR Steelhead
Alternative	**% of fish transported**	**% of fish transported**
2004 FCRPS BiOp	63%	66%
Plaintiff's P.I. proposal	58%	64%
2006 Planned Operation:		
April 3-19 spill and in-river migration	52%	53%
April 20-May max collection & transport	92%	95%
Season average	68%	91%

Table 1. Modeled Spring Operations for Snake River Spring/Summer Chinook Salmon and Snake River Steelhead

B. Summer Operations

[2] These estimates reflect the percentage of fish transported from those arriving at Lower Granite Dam. ~~that~~.

[3] The percentage of fish remaining to migrate in-river is then estimated simply by subtracting the percent of fish transported from 100%.

10. Additional SIMPAS modeling studies were conducted to evaluate and compare the percentage of Snake River fall Chinook salmon transported during the summer months of July and August. Again, three operational scenarios were evaluated for Snake River fall Chinook salmon migrants. The first was the 2004 FCRPS BiOp summer operation, which is used as the baseline to compare the other operations against. The second operation is the Plaintiff's proposal for injunctive relief in the summer. The third operation is the federal agencies' 2006 operations, which includes a summer transport and in-river smolt-to-adult return evaluation (see generally the Declarations of Colonel Martin and Rock Peters for descriptions of this operation). The summer spill operations under all three scenarios were then evaluated using the SIMPAS model to determine the percentage of fish transported and the percentage of fish migrating in-river under each operation.

11. The results of these SIMPAS modeling studies are shown in Table 2 below.

	SR fall Chinook
Alternative	**% of fish transported**
2004 FCRPS BiOp	82%
Plaintiff's P.I. proposal	33%
2006 Operations:	45%

Table 2: Modeled Summer Operations for Snake River Fall Chinook Salmon

12. It is worth noting that these transport percentages differ from the percentages reported in the Declaration of Thomas Lorz (even taking into account that Mr. Lorz' transport percentages appear to be estimated as the percentage of fish transported from the total number of fish starting at the head of Lower Granite Reservoir near Lewiston, Idaho). See Lorz Decl. at ¶ 26 and 37. For example, Mr. Lorz reports a 74% transportation rate for Snake River spring Chinook under his modeling of the 2004 BiOp operation, while our modeling of the 2004 BiOp operation yielded a much lower transported percentage of 59%, which is a 15% discrepancy (Lorz Decl. at ¶ 26). Similarly, for Snake River steelhead, Mr. Lorz again overestimates the percentage of fish that would be transported under the

2004 BiOp operation – he estimated 78% transported compared to only 63% based on our modeling. These discrepancies exist apparently because Mr. Lorz modeled a wide range of water conditions, including an extremely high 1997 (155% of average) water year and an extremely low 2001 (48% of average) water year, whereas we modeled an average water year. The point here is that, by including extremely high and low water conditions in his analysis, Mr. Lorz has overestimated the percentage of fish that would be transported under the 2004 BiOp operation, and thus underestimated the percentage of fish migrating in-river.

13. In addition, Mr. Lorz also overestimates the percentage of Snake River fall Chinook salmon that would be transported (41%) under the Plaintiff's proposed summer operation. See Lorz Decl. at ¶ 37. It appears (based on the limited information Mr. Lorz provided) that the modeling assumptions, specifically the fish guidance efficiencies, were not kept constant when comparing the 2004 BiOp operation with the plaintiffs' proposed operation. Mr. Lorz greatly increased the fish guidance efficiencies at the Snake River collector projects in his modeling of the plaintiff's proposed operation yet did not make similar changes in his modeling of the 2004 BiOp operation. Increasing the fish guidance efficiencies artificially inflated the percentage of fish transported in the Plaintiff's proposal. Mr. Lorz' modeling estimate of 41% of fish transported is inaccurate and should be adjusted downward to a 33% transportation rate.

II. EXPECTED NUMBER OF ADULT RETURNS

14. My staff also conducted an analysis to compare the relative effects on adult returns between the 2004 BiOp, the plaintiff's proposed operation, and the federal agencies' 2006 operations. The purpose of this additional analysis was to determine the optimum time during the spring to transition from in-river passage to a maximum transport operation for the federal agencies' operational

proposal.[4] The basis of comparison among the three operational alternatives was the effect on adult returns (SARs) anticipated under each of the three alternatives. An estimate was made of the SAR for the entire population under each of the three passage strategies, as well as a relative comparison to the 2004 BiOp (baseline) operation.

A. SAR Analysis Spreadsheet

15. Recent data on adult return rates taken from the NOAA technical memorandum, (Effects to the Federal Columbia River Power System On Salmonid Populations (Feb. 2005)), and updated to include more recent adult return rate information, indicates that the success of smolt transportation operations (expressed as SARs, or smolt-to-adult return rates) changes throughout the spring migration season. The number of adults returning increases for fish transported later in the migration season. In addition, the number of adults returning from fish which migrated in- river is highest for those fish migrating early in the spring migration season. These trends suggested that a fish passage strategy combining both transportation and in-river migration could produce higher adult returns than a strategy that relies primarily on either transportation or spill to assist in-river migration. We have employed an analytical method that broke the migration into discrete weekly segments, each of which was analyzed, and then combined to give an estimate of adult returns (SARs) for the entire spring migration season. Previous analyses conducted by NMFS used the SIMPAS downstream passage model, which estimates average fish passage, transportation and survival values for the entire migration period; however, the use of average values does not capture the temporal effects of SARs which change throughout the spring migration season.

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[4] The NMFS SIMPAS downstream migration model typically employs seasonal averages (rather than weekly values), thus it cannot be readily used for week-by-week passage and survival analyses. Thus an additional spreadsheet was developed to calculate the cumulative SAR estimates for spring migrants required for the analysis.

16. In our analysis, the degree of benefit provided under each alternative passage strategy was estimated by calculation of a cumulative SAR. The cumulative SAR is the sum of weekly SAR estimates to Lower Granite Dam. Weekly SAR estimates are the sum of SAR estimates for fish which migrated in-river or were transported during a particular week. The SAR estimate for each route of migration (i.e., transport or in-river) is the product of the proportion of the spring population that passed that week, the proportion of fish that migrate via that route, and the SAR estimate for the particular route of passage for that week.

17. Weekly SAR estimates, collection percentages and average spring run timing information were entered into the SAR analysis spreadsheet from other sources. The spreadsheet calculated the average weekly SARs for each species, hatchery and wild origin, based on a data table from the Northwest Fisheries Science Center's Effects to the Federal Columbia River Power System On Salmonid Populations (Feb 2005), and updated with the most recent adult return data. The estimate of the proportion of the run collected and transported versus the proportion of the run migrating in-river was estimated using the NMFS SIMPAS downstream passage model and that information was also entered into the SAR analysis spreadsheet.

18. The proportion of the total run for each species passing during a particular week was derived from a 5-year run timing average (1997-2003) calculated for hatchery and wild spring/summer Chinook, and a 3-year run timing average (1997-1999) calculated for hatchery and wild steelhead. The run timing averages were calculated from smolt collection data at Lower Granite Dam fish bypass facility (Downloaded from Fish Passage Center website, 11/ 7/2005, http://www.fpc.org/smolt/SMP_queries.html). The raw smolt collection numbers (representing fish observed in the bypass system) were expanded to a total estimate of smolt passage (including spill, bypass and turbine passage routes) using values and formulas from the NMFS SIMPAS passage

model. These passage estimates were converted into proportions of the total run and averages were calculated for each week over the spring season and across years. These calculations were made in a separate spreadsheet and then entered into the SAR analysis spreadsheet.

19. To calculate the cumulative SAR, a matrix was constructed for each of the three management or operational alternatives which calculated the SAR estimate for each week during the spring season for each species and for both transported and in-river fish, hatchery and wild origin. These weekly estimates were then summed over the spring season to provide an estimate of the cumulative SAR for a particular management strategy. The cumulative SARs for each alternative are reported in summary Table 3 below. The effect of different start dates for the alternative combination strategy was examined by constructing a matrix with different start dates in each row.

20. The estimated cumulative SARs for the three alternative fish passage strategies are shown in Table 3 for each alternative passage strategy, as well as the relative differences in SARs of both the Plaintiff's P.I. and the federal agencies' 2006 operations compared to the 2004 BiOp operation. This analysis indicates that the federal agencies' planned operations would yield a large improvement in SARs for both Snake River spring/summer Chinook salmon and Snake River steelhead over both the 2004 BiOp and Plaintiff's P.I. fish passage strategies. Analysis of the cumulative SAR relationship among species indicated the optimum date for transition from in-river passage to maximum transport operations occurred about the week starting April 20, which is supported by information contained in the Williams Second Declaration at paragraph 29.

Table 3—Summary results of the cumulative estimated SAR analysis of three alternative fish passage strategies.

Estimated Number of Adults returning per 100 smolts at Lower Granite Dam			
Hatchery	Wild Chinook	Wild Steelhead	Hatchery

Operational Strategy	Chinook						Steelhead	
	SAR	%change from Biop	SAR	%change from Biop	SAR	%change from Biop	SAR	%change from Biop
2004 BiOp	1.28	**0.0**	1.25	**0.0**	1.92	**0.0**	0.95	**0.0**
Plaintiff's P.I.	1.27	**-0.8**	1.22	**-2.2**	1.88	**-1.9**	0.94	**-1.1**
2006 Planned Operation	1.42	**10.8**	1.44	**15.8**	2.39	**24.7**	1.09	**15.5**

21. Based this SIMPAS modeling and the Second Declaration of John Williams, I conclude that the Corps' plan of spring and summer operations for the FCRPS, as outlined in the Declaration of Col. Martin and Rock Peters, is an appropriate application of the adaptive management principles for adjusting the operations called for by the 2004 Updated Proposed Action to respond to new scientific information. This plan is consistent with the adaptive management expectations of NOAA Fisheries Service's 2004 Biological Opinion. The Corps' plan adaptively modifies the operations of the 2004 Updated Proposed Action to better achieve its stated performance objectives for the listed species.

FISH PASSAGE CENTER MEMO

22. In the Declaration of Thomas Lorz at paragraph 28, Mr. Lorz references a memo compiled by the FPC on Preliminary Survival Analysis for Subyearling Chinook Originating Above Lower Granite Dam in 2005, and opines that this alleged analysis "showed a statistically significant difference in late season survival." Lorz Decl. at ¶ 28. Based on this report, Mr. Lorz concludes that "FPC's analyses and responses are sound" and further extrapolates that the "summer spill in 2005 provided survival improvements to in-river migrating juvenile fall Chinook." Id. Mr. Lorz' reliance on the FPC memo is not scientifically sound.

23. First, the FPC and Mr. Lorz fail to disclose why its analysis was limited to a comparison of the years going back only to 2001, when a more extensive data set is available, i.e., empirical reach survival data from Lower Granite tailrace to McNary Dam exists from 1998. A longer study period

may have shown different results, as LWG to MCN reach survivals of SR fall chinook in the 1998-2000 period were generally higher than the FPC-reported survivals during 2001 to 2005 period, even with no voluntary fish spill occurring at the four collector projects after about June 20. Moreover, it is uncertain what survival data were used by the FPC for 2002, as empirical reach survival estimates were unavailable that year due to poor fish condition. Put simply, the FPC report: (1) ignored readily available data (1998, 1999, 2000) that would have most likely produced a different result; (2) apparently used questionable data (2002); and (3) failed to affirmatively explain these discrepancies in its data set.

24. Second, the FPC report is notably silent as to the more meaningful issue of adult returns (SARs). As discussed in the Second Declaration of John Williams, the true measure of success for salmon and steelhead management is the number of adults that return to spawn. Even if we assume that there is a scientifically sound study that demonstrates increased juvenile fish survival through a particular stretch of river, such a study is meaningless in the context of adult returns. For example, if a hypothetical study indicated that there was 100% juvenile fish survival through a particular stretch, but three years later there were little or no returning adults, the study might be "statistically significant," but it would be relatively meaningless in terms of salmon and steelhead returns. A more relevant analysis would be a comparison of adult return rates (SARs) of in-river migrants to the SARs of transported fall Chinook salmon, an issue that the FPC memo does not and cannot address. This issue remains a critical uncertainty and is the crux of the scientific debate about juvenile fall Chinook management, i.e., whether it is better to collect and transport these fish or leave them in the river to migrate. The FPC analysis also does not indicate whether or how the summer spill program may have influenced the behavior or affected the survival of those juvenile fall Chinook that delay their migration and holdover in reservoirs.

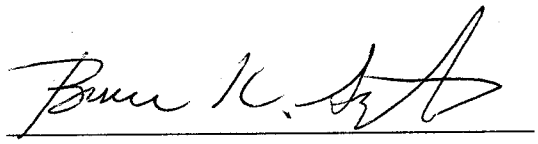
25. Finally, the FPC report segregated the SR fall chinook migration into two groups; a pre-spill (from May 20 until June 12) and a post-spill (June 17 to July 15) passage group. The choice of these particular dates for the two treatments is arbitrary and provides no meaningful basis for comparison. In fact, the separation of juvenile SR fall chinook into the pre- and post-spill groups, based on these particular dates, and comparing survivals and travel times between the years of 2001-2005 does not take into account the different historical run timing that has occurred or any differences in actual spill levels in those years. Also, the use of average spill rates experienced by a group of fish over a 3-4 week time period can mask the effects of different spill rates experienced by fish during each period. Thus, it is likely that different proportions of the run were affected by varying levels of spill in each of these groups during each of the study years.

26. For example, in 2005, *wild* SR fall chinook had one of the earliest migrations on record, with the 50% cumulative passage at LWG Dam occurring on June 18. In comparison, the 50% passage date in 2001 was on July 7, in 2002 it was July 1, in 2003 it was June 23, and in 2004 it was June 24. For *hatchery* SR fall chinook, which comprise the majority of the migration, it appears the 50% passage point occurred during the first week in June at the Snake River dams, with fish passage leveling off by the third week in June, or when the spill began at the Snake projects, e.g., 98% of hatchery fish had passed LWG by June 20. From smolt passage data, the vast majority of fish in the post-spill group passed LWG Dam between June 17 and June 20, leaving few fish to pass through the Snake projects during the actual summer spill period, which began on June 20. Thus, due to the early timing of the Snake River fall Chinook migration this year, most of juvenile Snake River fall Chinook had already passed through the lower Snake River before the summer spill program started. In short, the FPC's decision to utilize those arbitrary dates fails to recognize that the majority of fall Chinook run had already passed through the Snake River dams prior to the Court-ordered spill. Moreover, comparing

relative survival rates with such a small sample size, especially when we already know that later migrants experience higher mortality due to increased temperature and predation, does not reflect a biologically sound analysis useful for decisionmaking.

27. It is my opinion that it would be inappropriate to base salmon and steelhead management as well as operational decisions on a preliminary FPC analysis of juvenile survival in a memo due to the preliminary nature of the analysis and without knowledge of the implications on adult return rates.

Pursuant to 28 U.S.C. § 1746, I declare under the penalty of perjury that the foregoing is true and correct to the best of my knowledge, based on my education, experience and professional judgment. Executed November 18, 2005, in Portland, Oregon.



Bruce K. Suzumoto

Bruce K. Suzumoto
1201 NE Lloyd Blvd., Suite 1100
Portland, OR 97232

Summary

- Versatile manager and fisheries professional with 28 years of experience.
- Recent experience as technical/policy advisor on hydropower, hatchery and harvest issues to federally mandated regional council, utility trade organizations and public utility districts.
- Prior experience President/CEO of a large salmon aquaculture corporation.
- Expertise in Northwest fisheries issues, business management, planning and project management.
- Proven leadership record with excellent interpersonal and team building skills.

Education

Masters Degree in Fisheries — *1976*
***Oregon State University**, Corvallis, Oregon*

B.A. Degree in Biology — *1973*
***University of California San Diego**, La Jolla, California*

Career History & Accomplishments

Manager, Special Projects, *Northwest Power and Conservation Council, 851 S.W. Sixth Avenue, Suite 1100, Portland, Oregon 97204-1348.* — *November 1999 - Present*

Duties: Responsible for providing technical analysis and policy development in the areas of hydropower, artificial production and harvest. Provides technical information to Council members as requested. Develops salient issues and makes recommendations for consideration by the Council. Manages and implements regional processes as directed by the Council. Works and coordinates with regional entities on Council technical and policy issues in a variety of forums.

- Project manager for the Council's Artificial Production Review and Evaluation (APRE) process that comprehensively reviewed and evaluated over 500 hatchery programs in the Columbia Basin.
- Developed issues and provided technical analysis for the Council's Mainstem Amendments to the Fish and Wildlife Program.
- Organized and convened a scientific symposium on reservoir operations that helped to inform regional policy discussions and motivated Council action.
- Currently implementing regional process to develop provincial and basinwide objectives while integrating hatchery, habitat, hydropower and harvest activities .

Senior Biologist, *Public Power Council (PPC), 1500 NE Irving Street, Suite 200, Portland, Oregon 97232.* *June 1995 - October 1999*

Duties: Biological/technical representative for consumer-owned utility trade association. Responsibility for addressing Northwest regional fish and wildlife issues of concern to membership. Goal of position was to promote a cooperative fish and wildlife protection and restoration effort in the Northwest.

- Worked with regional scientists on technical committees concerning hydropower, artificial production and harvest issues.
- Organized and facilitated a PPC conference on Habitat Conservation Plans and methodologies for addressing the Endangered Species Act.
- Cooperated with local watershed groups to develop specific watershed rehabilitation projects and funding sources.

Senior Fisheries Biologist, *Pacific Northwest Utilities Conference Committee, 101 SW Main Street, Suite 810, Portland, Oregon 97204.* *October 1994 - May 1995*

Duties: Biologist/analyst for electric utility trade association. Responsibility for technical analysis of fish related hydropower issues on the mainstem Columbia/Snake rivers.

- Provide technical analysis of adult and juvenile passage issues, flow/survival relationships mainstem passage and life cycle models, bypass systems, gas supersaturation issues and fish transportation.
- Extensive interaction and communication with utility, federal and state biologists on various committees and groups.

Senior Biologist, *Grant County Public Utility District, P.O. Box 878 Ephrata, WA 98823.* *January 1993 - October 1994*

Duties: Biologist responsible for addressing regional fish issues which impact the utilities hydropower operations.

- Analyzed and briefed management on biological and technical aspects of the Endangered Species Act, Snake River Recovery Plan and Mid-Columbia Habitat Conservation Plan.
- Facilitated development and wrote the Fish and Wildlife Department strategic plan.
- Member of hydroproject relicensing team and regional utility fish and wildlife committee.
- Worked with state and federal agencies, Indian tribes and other utilities to achieve understanding and agreement on fish related issues.

Fisheries Consultant, *7031SW 29th Avenue, Portland, Oregon 97219.* *October 1991 - December 1992*

Focus: Fisheries consultant with emphasis on fish restoration programs, commercial harvest and salmonid hatchery operations. Clients included Ecotrust, The Nature Conservancy and the Willapa Alliance.

- Completed a written analysis of the historical and current status of the salmon resources in Willapa Bay, WA and provided recommendations for rehabilitation of stocks.
- Organized and initiated a fish enhancement and rehabilitation effort for Willapa Bay, WA. Worked with governmental agencies, Indian tribes, area landowners, local business owners, conservation organizations and commercial and sport fishers to develop an acceptable program.
- Participated in the development of a citizen-led strategy to rebuild coastal salmon stocks sponsored by the Bullitt Foundation.

President, *Prince William Sound Aquaculture Corporation, P.O. Box 1110, Cordova, Alaska 99574.* *March 1987 to September 1991*

Duties: Chief executive in charge of internal and external affairs of a large private, non-profit salmon aquaculture corporation. Primary responsibility for all phases of management including administration, operations, finance, marketing and capital projects. Worked with board of directors from different interest groups to develop policies and strategic goals. Extensive contact with government agencies and state legislature. Public relations experience dealing with issues on a local and statewide basis.

- Managed annual budget of $10 million and staff of more than 100.
- Corporate revenues increased over 7 times during tenure.
- Annual fish production increased from 250 million to 550 million.
- Managed the Prince William Sound hatchery protection program during the 1989 Exxon Valdez oil spill.
- Facilitated the transfer of two state hatcheries to the corporation.
- Administered the policy development and implementation of a highly contentious fish allocation plan.
- Initiated a new marketing program for Alaskan pink salmon.

Vice President/Operations Manager, *Prince William Sound Aquaculture Corporation, P.O. Box 1110, Cordova, Alaska 99574.* *June 1984 - February 1987*

Duties: Overall management of three hatcheries raising pink, chum, coho, Chinook and sockeye salmon. Annual production of fry and smolts exceeded 250 million.

- Recruited, hired trained and evaluated 30 permanent hatchery staff.
- Developed annual management plans and operating budgets for all company facilities.
- Managed fish sales contracts and maintained relationships with processors and commercial fishers.

Bioengineer, *Prince William Sound Aquaculture Corporation, P.O. Box 1110, Cordova, Alaska 99574.* — *May 1983 - May 1984*

Duties: Designed computer assisted biological and financial models for use in corporate and regional aquaculture planning. Contributed to the design and planning of new hatcheries utilizing understanding of salmonid behavior , fish passage and water quality requirements. Supervision and participation in remote eggtakes.

Research Scientist, *Weyerhaeuser Research and Development, Oregon Aqua Foods, Springfield Oregon.* — *October 1979 - April 1983*

Duties: Supervised and conducted salmon aquaculture research. Design and implementation of experiments, coordination of research and production activities, and supervision of research employees. Responsible for research lab management.

Volunteer Work

Professor of Fisheries, *U.S. Peace Corps/Smithsonian Institution, Universidad Tecnica del Estado, Puerto Montt, Chile.* — *April 1977 - July 1979*

Duties: Taught university's fisheries courses in fish culture and fish diseases. Developed and supervised university operated fish hatchery raising rainbow and brown trout. Served as fish disease consultant for government fish hatcheries. Conducted stream surveys and performed fish inventory work on various rivers and streams in southern Chile.

Other Skills

- Oral fluency in Spanish.
- Extensive experience in strategic planning.
- Facilitation skills working with diverse groups.
- Computer proficiency using various software programs.

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